A generalized three invariants cap model and its numerical implementation to study soil-foundation interaction

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Computing in Civil and Building Engineering
Vol. , Issue., 1993

Abstract: This paper presents a modified cap model that is capable of characterizing cyclic stress-strain behavior of soils and describing variation of shear strength along various stress paths on the octahedral plane. The kinematic hardening rule is used along with the three stress invariants in the model formulation. The work presented in this paper includes backprediction and implementation of the model in a finite element code. The obtained set of parameters is used to predict stress-strain responses for a number of paths including the simple shear test. Therefore, the model is used to solve a boundary value problem of a rigid model footing resting on sand. Results show that the modified model is able to predict the behavior of cohesionless soil when subjected to cycling loadings.